JCM Proposed Methodology Form

Cover sheet of the Proposed Methodology Form	

Form for submitting the proposed methodology

Host Country	Ethiopia
Name of the methodology proponents submitting this form	NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.
Sectoral scope(s) to which the Proposed Methodology applies	1.Energy industries (Renewable sources)
Title of the proposed methodology, and version number	Electrification of communities using Micro hydropower generation, version 1.0
List of documents to be attached to this form (please check):	☐The attached draft JCM-PDD: ☐Additional information
Date of completion	08/01/2016

History of the proposed methodology

Version	Date	Contents revised
01.0	08/01/2016	First edition

A. Title of the methodology

Electrification of communities using micro hydropower generation, version 1.0

B. Terms and definitions

Terms	Definitions
Micro hydropower generation unit	Micro hydropower generation unit is a hydropower generation unit with generation capacity of 30 kW or less.
Run-of-river power generation	Run-of-river power generation is a method of power generation that uses water running in a river or a waterway directly into power generation unit without storing water in a reservoir.
Open channel	The waterway with a free surface open to the atmosphere.

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	Displacement of electricity using diesel fuel and/or lighting using kerosene by installation and operation of the micro hydropower generation unit.
Calculation of reference emissions	Reference emissions are calculated on the basis of the consumption of electricity generated by micro hydropower generation unit multiplied by emission factor of diesel or kerosene.
Calculation of project emissions	The project does not assume any project emissions.
Monitoring parameters	The quantity of total electricity consumption by the consumers as a whole and/or each consumer.

D. Eligibility criteria

This methodology is applicable to projects that satisfy all of the following criteria.

Criterion 1	The project installs a run-of-river micro hydropower generation unit which is not connected to national electricity grid.

Criterion 2	The micro hydropower generation unit is installed in open channel with difference of elevation of 5m or less between the upstream and downstream.
Criterion 3	Project monitors the quantity of total electricity consumption by the consumers as a whole.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
Consumption of electricity from diesel generation unit	CO_2
Consumption of lighting from kerosene lamps	CO_2
Project emissions	
Emission sources	GHG types
Generation of electricity from micro hydropower unit(s)	N/A

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

The project is executed in the off-grid area. Therefore, the reference scenario assumes the emissions due to electricity supplied by diesel generation unit or kerosene lamps.

If electricity consumption of individual consumer is monitored (hereafter "individual monitoring"), the *calculation method 2* can be applied as necessary. If individual monitoring is not in place, the *calculation method 1* is applied for any cases.

In order to fulfill the requirement of net emission reduction, the reference emissions are calculated based upon the emission factor of 1.0 tCO_2/ MWh for diesel generation unit which is less than the lowest value indicated in Table I.F.1 in CDM SSC methodology AMS-I.F for the equivalent load factor to the micro hydropower generation unit of 30kW.

F.2. Calculation of reference emissions

1. Calculation method 1:

$$RE_y = EC_{total,y} \times EF_{CO2}$$

RE_y	Reference CO_2 emissions in year *y*. [tCO_2/yr]
$EC_{com,y}$	Total electricity consumption by the community in year *y* of the project. [MWh]
EF_{CO2}	CO_2 emission factor of the diesel generation unit. [1.0 tCO_2/ MWh]

2. Calculation method 2:

$$RE_y = RE_{55,y} + RE_{ot,y}$$

$$RE_{55,y} = \sum_{i=1}^{My} EC_{i,y} \times EF_{CO2,FUEL}$$

$$RE_{ot,y} = (EC_{total,y} - \sum_{i=1}^{My} EC_{i,y}) \times EF_{CO2,ELEC}$$

RE_y	Reference CO_2 emissions in year *y*. [tCO_2/yr]
$RE_{55,y}$	Reference CO_2 emissions for consumers with individual monitoring that consumed equal to or less than 55 kWh of electricity in year *y*. [tCO_2/yr]
$RE_{ot,y}$	$RE_{ot,y} = RE_y - RE_{55,y}$ Reference CO_2 emissions for electricity consumption by consumers with individual monitoring that consumed more than 55kWh excluding their first 55kWh consumed (accounted as displacement of kerosene lamps) and electricity consumption of consumers without individual monitoring.
$EC_{i,y}$	Consumption of electricity with individual monitoring that consumed equal to or less than 55 kWh in year *y* of the project. [MWh]
$EC_{total,y}$	Total electricity consumption by the consumers in year *y* of the project. [MWh)
$EF_{CO2,FUEL}$	CO_2 emission factor of the lighting from kerosene lamps. [6.8 tCO_2/ MWh]
$EF_{CO2,ELEC}$	CO_2 emission factor of the diesel generation unit. [1.0 tCO_2/ MWh]
M	Number of household(s) of individual monitoring in the project activity.

G. Calculation of project emissions

There are no project emissions.

$$PE_y = 0$$

H. Calculation of emissions reductions

$$ER_y = RE_y$$

I. Data and parameters fixed *ex ante*

The source of each data and parameter fixed *ex ante* is listed as below.

Parameter	Description of data	Source
EF_{CO2}	CO_2 emission factor of the diesel generation unit. (1.0 tCO_2/ MWh) CO_2 emission factor of the most efficient diesel generation unit with capacity of 35 to 135kW, which is more conservative than the CO_2 emission factor of the most efficient diesel generation unit with capacity up to 30kW.	Table I.F.1 in CDM SSC methodology AMS-I.F "Renewable electricity generation for captive use and mini-grid" Ver.2
$EF_{CO2,FUEL}$	CO_2 emission factor of the lighting from kerosene lamps. (6.8 tCO_2/ MWh)	CDM-SSC WG [Rationale for default factors used in the proposed methodology SSC-I.L "Electrification of rural communities using renewable energy"]
$EF_{CO2,ELEC}$	CO_2 emission factor of the diesel generation unit. (1.0 tCO_2/ MWh)	Table I.F.1 in CDM SSC methodology AMS-I.F "Renewable electricity generation for captive use and mini-grid" Ver.2